CLINICAL PROCEEDINGS

of the

CHILDREN'S HOSPITAL

WASHINGTON, D. C.

June 1953

VOLUME IX NUMBER 6

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CLINICAL PROCEEDINGS

OF THE CHILDRENS HOSPITAL

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CONTENTS

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The editors of *Clinical Proceedings* feel that poliomyelitis is a timely subject for discussion at this season of the year, so they are making it the theme of this June issue. They have garnered information on research, as well as on practical management aspects of the disease, presented here with a statistical evaluation and psychiatric interpretation. It is hoped that these data will help readers and practitioners to meet their own problems and to answer the questions of parents.

IMMUNITY AND THE PREVENTION OF POLIOMYELITIS*

A Guest Editorial

Karl Habel, M.D.

In order to understand the rationale behind current and future attempts to prevent poliomyelitis, it is important to view these suggested procedures against the background of our knowledge concerning pathogenesis, immunity, and epidemiology of the disease.

At the present time, the oral cavity is usually implicated as the portal of entry of the virus, although the nasal passages cannot strictly be excluded. Much evidence points to the pharyngeal membrane as the actual tissue site of entrance of the virus into the body but many workers would give major importance to the gastrointestinal tract. There is likewise no agreement as to what happens to the virus after its initial entrance into body tissues except that it multiplies at some site outside the central nervous system. The only positive evidence points to peripheral ganglia as being involved. During this period of virus multiplication outside the central nervous system there is evidence that the virus enters the blood stream temporarily but the question of whether viremia is the usual or an important part of the pathogenesis of poliomyelitis has not been answered for humans. The invasion of the central nervous system by virus is by no means the usual occurrence at this stage of the disease. In fact there is good reason to conclude that it is the rare and unusual person who gets actual central nervous system involvement with clinical paralysis.

During the disease process, virus is also excreted from the body. Prior to and for a few days following the onset of paralysis in paralytic cases and the febrile period in non-paralytic cases, the virus is present in the pharynx. Virus in the stool, however, appears early in the clinical disease and persists for relatively long periods of convalescence. Starting relatively early in clinical disease, specific antibodies are developing and may be demonstrated in the blood serum.

* From the Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, National Microbiological Institute, Laboratory of Infectious Diseases, Bethesda, Maryland.

STRAINS AND IMMUNITY

Infection by poliomyelitis includes a broad spectrum of clinical manifestations from fatal bulbar or spinal paralytic to non-paralytic to inapparent disease. All these types have been shown to be caused by the virus through isolation of the virus itself and the demonstration of a rise in specific antibodies. Although it is generally felt that these various clinical types of infection actually result in immunity, there is little direct evidence in humans that this is true. Second attacks of poliomyelitis have occurred but in the few such cases studied, laboratory tests indicate that the two attacks were caused by two immunologically distinct strains of virus.

The multiplicity of virus strains is a very important fact to be considered in approaching the prophylaxis of poliomyelitis. It is now known that poliomyelitis in humans may be caused by three different types of virus between which there is probably little cross immunity. Most large epidemics studied from the standpoint of the causative agent have been found to be due to Type I virus. Type II virus on the other hand causes relatively few clinical cases in this country, yet most adults have antibodies to it. Many epidemiological surveys have been carried out in different parts of the world on the age distribution of polio antibodies. Most of these studies have tested only for antibodies to Type II virus. In tropical countries and areas of poor sanitation these antibodies appear within the first 2 to 3 years of life and it has been noticed that most paralytic polio cases in these areas occur in infants. In the temperate zone and more specifically in certain cities of the United States these antibodies are acquired more slowly so that children in the age group 8 to 12 years are just catching up to the two-year-olds of tropical countries in incidence of antibodies. This means that in this country the population is quite a bit older before becoming immune to this particular strain of polio. It is true that the peak age distribution of paralytic disease in the United States tends to be in children beyond infancy and cases in adults are not infrequent.

EPIDEMIOLOGY

Many unknown factors probably operate in the epidemiology of polio but it would appear that polio infection is relatively widespread in most heavily populated areas every summer. When clinical cases occur there may be as many as 100 other persons infected but not clinically ill for every case diagnosed. Spread seems to be by contact with a case or a healthy carrier (inapparent infection). So the overall attack rate of clinical poliomyelitis is quite low in most areas most years in spite of the fact that an abundance of virus is circulated. Clinically there is no way of predicting which individual will be the one to get paralytic disease and epidemio-

logically it cannot be predicted which year or which area will experience an outbreak. The ubiquity of the virus infection during the poliomyelitis season makes it difficult to evaluate exposure although there is a tendency for second cases in households to develop at a rate higher than for the general population. However, 70 to 80% of these secondary cases in the household follow the primary case within 2 weeks of the initial victim's onset so they may actually represent a simultaneous original exposure.

The rationale behind the attempt to demonstrate protection against poliomyelitis in humans by the use of immune serum globulin (gamma globulin) was based first of all on the demonstration that Red Cross gamma globulin contained good amounts of antibodies to all 3 strains of virus. Then, too, early animal experiments indicated that at least with certain of the polio viruses, relatively low levels of serum antibody were sufficient to protect against paralytic disease when the natural type of exposure was simulated in monkeys. It was also known that the half-life of gamma globulin from human serum when administered to humans was about 12 days so protective levels might last several weeks if the initial dose was large enough. Of course, the background of experience in the use of Red Cross gamma globulin for the prevention of measles gave every evidence that no deleterious effects were to be expected from widespread use of this material (no serum hepatitis, etc.).

The results of the field trials of gamma globulin in 55,000 children have recently been reported by Hammond and his associates. These showed twice as much paralytic poliomyelitis in a control group receiving inert gelatin as in the group of children given gamma globulin. However, even with the inclusion of mild paralytic cases in this study, about 1000 children had to be given gamma globulin in order to prevent one case of paralytic disease and this during unusually severe epidemics. There is as yet no evidence in humans that this type of passive protection which apparently persists for about 5 weeks, will result in permanent immunity in any number of individuals because of an infection suppressed by the antibody. Even if this were to occur the ensuing immunity would be only to the type of virus prevalent in that particular epidemic.

Although it is not the purpose of this discussion to consider the questions of allocation of gamma globulin for use in poliomyelitis, several considerations are pertinent to any understanding of its use. Gamma globulin is of no known value in treating a case after onset of clinical disease. There is some evidence in a very small number of cases that if the globulin is given during the incubation period after exposure the subsequent paralysis might be less severe. The criteria for its use will, of course, be different at a time when the supply is limited which is the situation this year as compared to a time when larger amounts are available. Obvi-

ously those at most risk should receive the material first. This means the age group most usually involved, under 15 years, pregnant women who seem more susceptible, large groups subjected to possible continuing exposure in a closed population such as household and intimate contacts of cases, camps or schools where cases are occurring. However, it must be remembered that the only positive demonstration of effectiveness has been in the mass use in children in the face of a sharp outbreak. Actually, knowing the usual low incidence rates of poliomyelitis, the number of individuals that have to be inoculated to prevent one case, and the relatively short period of possible protection, there is a question as to whether if we were dealing with anything other than poliomyelitis we would even consider its use at all. But paralytic poliomyelitis is a crippling disease with many emotional and psychological implications, so of course it will be used in spite of the expected low level of effectiveness.

Before ending this discussion some mention should be made of the considerations necessary in looking ahead to the time when a polio vaccine may be available. Past experience requires great precautions concerning the safety of any such vaccine to be sure that live virulent virus may not be inoculated with the vaccine. Direct evidence of its effectiveness may be difficult to get in humans but is now available in animals. Indirect evidence of effectiveness in humans will be possible by measuring antibody response. To be effective any polio vaccine must give immunity to all known types of polio virus. We cannot forget the possibility of the emergence of new virus types, a phenomenon definitely demonstrated in human influenza. Two very pertinent questions for which answers will not be forthcoming in the near future, are: (1) What is the duration of the immunity conferred by active vaccination and, (2) as a result of exposure during a temporary vaccine-induced immunity does a life-lasting protection develop? It should also be emphasized that at the present time there is no practical test for determining who is susceptible and who is immune to poliomyelitis.

DISTRIBUTION OF GAMMA GLOBULIN IN 1953*

John R. Pate, M.D.

Field tests conducted during the past two years have determined the probable effectiveness of gamma globulin in preventing or minimizing the paralytic manifestations of poliomyelitis. As a result, this blood derivative

* Issued by the Director, Bureau of Preventable Diseases, Government of the District of Columbia, Health Department.

will be in great demand in poliomyelitis epidemic areas this year. The supply is limited both by the availability of blood, and the capacity of the fractionization plants. The office of Defense Mobilization was designated several months ago as the agency to allocate the globulin through the official Health Departments. The globulin for the central distribution pool for civilian purposes is being furnished without charge by the American Red Cross and the National Foundation for Infantile Paralysis, who are paying for the preparation of the material as well as for purchasing the available commercial supplies for inclusion in the allocation plan. A panel of medical authorities was appointed by the National Research Council to decide the basis of distribution and to develop criteria for the use of the globulin. This panel has completed its plans and made them known through the state and territorial Health Officers Association. The plan is subject to amendments and changes as experiences and latter advice will indicate, though in general all official Health Departments must conform to the recommended criteria. The main provisions of the national plan and its application to the District of Columbia are as follows:

1. *Packaging*

Poliomyelitis immune gamma globulin will be packaged in 2 cc. vials. It is to be remembered that the immune poliomyelitis globulin has been tested for neutralizing antibodies and, therefore, is distinguished from gamma globulin that is to be used in measles and infectious Hepatitis.

2. *Allotment*

The allotment is made to states, territories and the District of Columbia based on the median number of reported cases through the five year period of 1947 to 1951. This amounts to 6,900 cc. for the District of Columbia. At appropriate intervals after May 1, additional allocations of 60 cc. will be made for each reported case in excess of the five year median for that time of year. About July 1 and at biweekly intervals thereafter until October 1, further supplemental allocations will be made in proportion to the number of cases being reported by each state. Fifty-seven per cent of the total supply of gamma globulin available for the prophylaxis of poliomyelitis will be distributed in this pre-determined fashion. The medical profession has been requested to report current experiences in terms of paralytic and non-paralytic cases, however, because it may be necessary to make adjustment in relation to the proportion of paralytic cases reported.

3. *National Reserves for Mass Community Prophylaxis of Poliomyelitis*

A reserve of 33 per cent of the total supply of gamma globulin available for the prophylaxis of poliomyelitis will be retained by the National Al-

locating Authority for mass community prophylaxis, and another 10 per cent for unusual situations requiring emergency distribution and for special situations.

4. *Criteria for Use in Poliomyelitis Prophylaxis*

A. Gamma globulin is being prepared for prophylactic use only. There is no indication that it is of value after the appearance of symptoms.

B. Household contacts of clinically diagnosed cases, according to the evidence may receive effective prophylaxis or modification in many instances. It is recommended, therefore, that the globulin be administered to contacts of diagnosed cases as follows:

1. Household contacts under 30 years of age,
2. Pregnant women of any age.

5. *Other Criteria*

If during this season the epidemic reaches more than the expected number of cases re-allocation will be planned and the medical profession will be properly notified.

DISTRICT OF COLUMBIA DISTRIBUTION PLAN

The plan of distribution and recommendations agreed upon by representatives of the Medical Societies of the District of Columbia are as follows:

1. There will be three distribution centers, namely; Children's Hospital; Office of Bureau of Vital Statistics, District of Columbia Health Department; and Gallinger Hospital.

2. Physicians requiring gamma globulin for prophylaxis will be asked to give information so that an accurate record may be kept on all material distributed, in order that it may be replaced. It may be issued at the request of the physician upon presentation of physician's prescription at any of the three distribution centers, providing the prescription states the amount of gamma globulin needed, the name, address and weight of the exposed individual for whom it is to be used, and also the name, age and date of onset of the patient who exposed the individual.

3. The recommended dosage for the prophylaxis of poliomyelitis is 0.14 cc. per pound of body weight. In general it may be estimated that patients 6 months through 2 years require approximately 3 cc., 3 years through 15 years approximately 1 cc. per year, adults and pregnant women about 20 cc.

Records and Inventory Reporting

To assure equitable distribution it will be necessary for the distribution center to keep systematic records of the supply of gamma globulin on hand, amount received and amount released.

Physicians are reminded and should emphasize to the contacts of their patients that there is no absolute proof that gamma globulin will prevent all cases of paralytic poliomyelitis, and that the protection afforded by the globulin continues only from 4 to 5 weeks. Such things as adequate

sanitation, personal hygiene and sufficient rest must continue to be emphasized. We all look forward to a better and surer method of poliomyelitis prevention in the near future, as research workers have given hope that an adequate vaccine will be perfected. However, until this is a scientific fact, gamma globulin is our most effective weapon.

DISTRIBUTION PLAN FOR SURROUNDING COUNTIES

At the time of the present writing, contacts of patients from the counties surrounding the District of Columbia must be referred to their local county Health Department for distribution of gamma globulin for the prophylaxis of poliomyelitis. The allocation plans for these Health Departments are essentially the same as those for the District of Columbia.

POLIOMYELITIS AT CHILDREN'S HOSPITAL, 1952

Jerome Bernstein, M.D.
Irving Hall, M.D.

The purpose of this presentation is to record the clinical findings on patients with anterior poliomyelitis admitted to Children's Hospital during 1952, a year which incidentally introduced major advancements in our knowledge of poliomyelitis[1, 2]. The information herein is presented in much the same order as previous studies at this hospital.[3] Other aspects of poliomyelitis and the relationship of these developments are treated in various sections of this publication.

Two hundred forty-four patients with this disease were admitted to Children's Hospital during 1952. The number of cases treated in this hospital may be compared with the number of cases admitted in 1951 (133), 1950 (266), and 1949 (154). The year's toll was considered severe—approximately 440 cases were reported to the District of Columbia Health Department. The experience at Children's Hospital may be considered significant for analysis, since more than half the cases for the entire metropolitan area (including nearby Maryland and Virginia) were admitted here. Undoubtedly this figure included an even higher percentage—more than half—of the pediatric population.

Data presented here were extracted from 223 hospital charts. Included with these charts was a special "polio form" blank to be filled out on all children with proven or suspected poliomyelitis on admission to the hospital. Space is provided on this blank for basic information pertinent to the initial history and physical examinations, in easily tabulated form.

Diagnosis was established solely on the basis of history, physical ex-

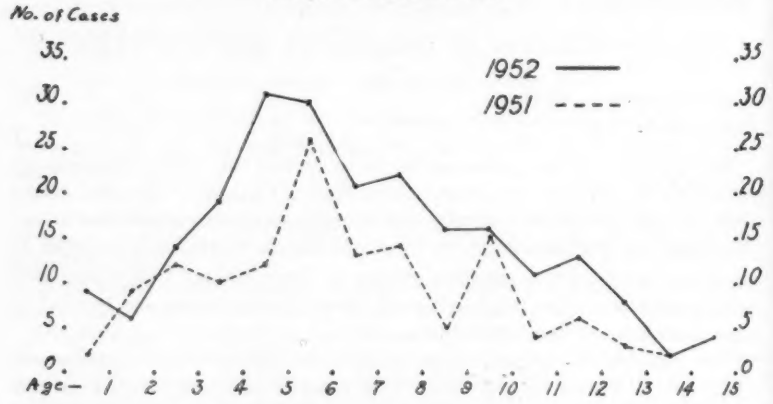
amination and spinal fluid findings. Employing these as a basis has limited the scope of investigation, as in any similar evaluation made without the benefit of virus studies. For example, several cases of stiff neck, headache, diarrhea, abdominal and extremity pain eventually were correctly diagnosed and treated as Shigellosis. In many cases, mumps encephalitis could not be ruled out.

INCIDENCE

Of the 223 cases, 140, or 63 per cent, were males and 83, or 37 per cent, were females. Ninety per cent or 201 children were white and ten per cent,

TABLE I

Comparative Age Distribution of Poliomyelitis Patients Admitted to the Children's Hospital in 1951 and 1952



or 22, were colored. This percentage of incidence is consistent with previous reports. There is a significant difference revealed in comparing these figures to the total hospital population, with a ratio of 60 per cent white to 40 per cent colored.

The ages of the patients ranged from eight weeks through fifteen years. (See table I for the age distribution.) There were fifteen patients aged one year or less, some of whom developed paralysis. One colored child of eight weeks developed no paralysis; while two children, aged three months and five months, developed marked lower-extremity paralysis.

Tables II and III present the seasonal incidence and type of diseases respectively. The months of highest incidence were August, with 48 per cent; September, 23 per cent; and October, 8 per cent. Table II compares these figures with the monthly distribution of cases in 1951. The curves

TABLE II

Distribution by Months of Poliomyelitis Cases Treated at The Children's Hospital, Comparing 1952 with 1951

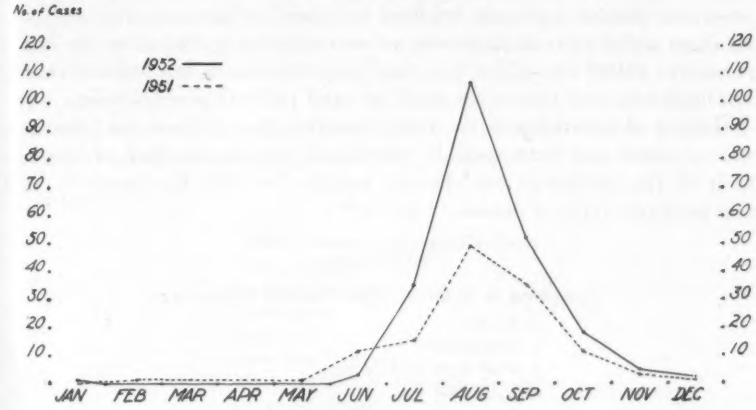
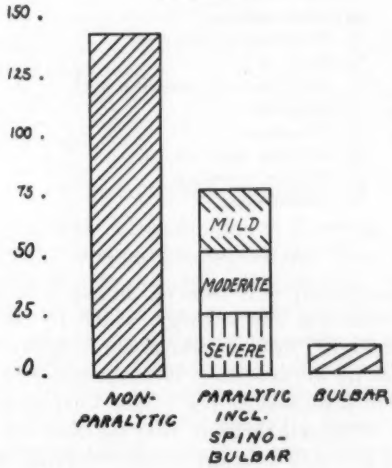


TABLE III

Distribution of Poliomyelitis Cases Treated at Children's Hospital According to Types of Disease



are similar. Analysis of the cases according to types of clinical disease shows that 65.5 per cent were non-paralytic and 34.5 per cent were paralytic. Eleven cases were of the bulbar type; eight, spinobulbar; and fifty-

eight, spinal. The proportion of cases with mild, moderate, and severe residuals among the spinal and spinobulbar types was approximately equal.

The experience of the past year is in accord with the statement of other observers that of each one hundred poliomyelitis patients who are hospitalized under present diagnostic methods it is likely that after the acute phase has passed 65 to 70 will be unaffected physically, ten will have mild, ten moderate, and ten severe paralysis, and two will probably die.

History of recent injections, recent trauma, recent illness, and exertion was obtained and evaluated. It was found that the number of cases in each of the categories was divided equally between the paralytic and non-paralytic types of disease.

TABLE IV

Symptoms in Order of Most Frequent Occurrence

1. Fever
2. Headache
3. Stiff neck and/or pain
4. Vomiting
5. Lethargy
6. Pain elsewhere—mostly abdominal
7. Nausea
8. Stiff back or pain
9. Sore throat
10. Constipation
11. Weakness or paralysis
12. Rhinitis
13. Fever during preceding week
14. Diarrhea
15. Delusions
16. Difficult respirations
17. Urinary retention
18. Convulsions

SYMPTOMS AND SIGNS

The most common symptoms observed in the order of sequence, were fever, stiff back, vomiting and lethargy. Table IV more clearly demonstrates symptomatology. Physical findings are similarly shown in Table V.

A prominent feature in these cases is the presence of hamstring spasm. Another finding which experience has taught the examiners to consider is circumoral pallor. Although this sign may be observed in other diseases, even in those cases in which fever is the only symptom, it is seen with some regularity in acute poliomyelitis. The temperatures of the 223 patients ranged from 98 to 105.5 F. The majority was between 101.0 and 103.0. A temperature above 103.0 F., in the absence of bulbar poliomyelitis or an observed complication, prompted further diagnostic investigation. Such

difficulty in diagnosis, as mentioned in the introduction of these pages was encountered, particularly among the colored children. Only four out of twenty-two of these children had any paralysis and only two had a crippling paralysis. These children presented headache most prominently as a symptom; neck and back stiffness were never foremost. Abdominal pain and tenderness accompanied the headache for several days. In the presence of the above symptoms there was no hamstring spasm, and when these patients were afebrile after three to five days, they seldom needed hot packs or reeducation in preparation for discharge.

TABLE V

Most Common Physical Findings

1. Nuchal rigidity
2. Hamstring spasm
3. Back spasm
4. Lethargy
5. Decreased reflexes
6. Flushed facies and circumoral pallor
7. Inflamed throat
8. Weakness or paralysis
9. Positive Kernigs

TABLE VI

Average Spinal Fluid Determination

White blood cells	187 per cu. mm.
Polymorphonuclear leukocytes	47.8 per cent
Lymphocytes	52.2 per cent
Protein	35.0 mg. per cent
Sugar	48.3 mg. per cent

LABORATORY FINDINGS

The average spinal fluid determination is shown in Table VI. It may be mentioned that the range of pleocytosis was from 0 to 1350. In those cases when the white blood cells numbered more than 500 per cubic millimeter, and the clinical findings seemed equivocal, the diagnosis was challenged, and these children were sometimes subjected to another cerebrospinal examination. Other laboratory data of interest included the peripheral white blood cell count which averaged 9,050 and ranged from 2100 to 24,300. Urinalyses generally showed a high specific gravity and acetone, thus confirming the symptoms of gastro-intestinal disturbances.

CONTACTS

Approximately 26 contacts were observed (12 per cent), but it is of interest that of these contacts eleven pairs were siblings and both siblings

were in this hospital at the same time. In a small number of cases (approximately 10) a pregnant woman was either in the household or in close association with the affected child. We might entertain the hypothesis that hormonal balance during pregnancy may influence the carrier state of poliomyelitis.

MORTALITY

Four children died of poliomyelitis during the year. Three of these died within twenty-four hours after admission to the hospital. These patients were overwhelmed by bulbar poliomyelitis and presented signs of respiratory and circulatory center collapse. The fourth case, a three-year-old-child, who had bulbospinal poliomyelitis with severe paralysis of all four extremities and the diaphragm, died of pneumonia four months after admission. Excluding this last case, 1.3 per cent of all cases were fatal. This represents 27 per cent of the bulbar cases.

TREATMENT

Management of the acute phase in this hospital followed a general pattern and "routines" were established for nursing efficiency. The cases were broken down into (1) acute, (2) respirator, and (3) bulbar, and plans were drawn for the management of each group.

1. For the average acute case, the patient was placed in bed, the extremities being kept in proper position with the aid of a foot board. Emphasis was placed on comfort and posture control, nursing care and the maintenance of close cooperation between doctor, nurse and patient being relied on to accomplish these results. Hot packs were applied for the relief of pain and spasm. Parenteral fluids, parasympathomimetic drugs for bladder and bowel relief, and barbiturates were used as indicated. If paralysis developed, this treatment was still continued until a new "treatment status" developed.

2. Respirator cases required a great deal of special care. A child was placed in a respirator as soon as intercostal weakness was observed. Careful observation of vital functions was carried out and Bicillin®, 600,000 units weekly, was administered to the patient. Proper nursing care was extremely important in these cases also.

3. Bulbar cases were so designated when a child had difficulty swallowing, coughing or talking. In addition to receiving treatment previously discussed, these children were placed in Trendelenburg position; beyond this no position discipline was maintained. These patients also received Bicillin® and special nursing care. The airway in these cases was the chief concern. It was maintained by applying suction, administering oxygen and encouraging the patient to cough. Parenteral fluid therapy was relied

on in most cases, oral fluid intake not being stressed unless the child was able and willing to cooperate. No form of sedation was allowed these children.

The electrophrenic respirator is another therapeutic tool which apparently saved lives in several cases. The most promising use of this instrument was in those cases of poliomyelitis exhibiting encephalitic findings. When stimulated about every six hours these patients seemed more alert, breathed more actively and looked generally better. The value of the electrophrenic respirator under these conditions has been elaborated in a discussion of the hypoventilation syndrome by LoPresti[4].

Tracheotomy was used in six cases during the year. The indication for surgery was inability to maintain a clear airway. When oral suction was no longer adequate a tracheotomy was performed. Generally, in any child with bulbal-intercostal paralysis a tracheotomy was performed and the patient placed in a respirator. In two cases bilateral pneumothorax was a complication of tracheotomy.

Following the isolation period, which was defined as one week after the onset of symptoms, the management passed into the hands of the orthopedic surgeons. After the temperature had remained within normal range for 48 hours each child received a muscle evaluation by the physiotherapy department or an orthopedic surgeon and was started on hot prone packs as indicated. Appropriate amounts of sodium chloride were administered at the time the packs were applied. These procedures were continued, the patient remaining in the isolation ward until the acute phase officially ended or until convalescent space became available. Muscle reeducation, the most difficult part of the patient's recovery, began as soon as transfer from the isolation ward was effected.

SUMMARY

1. Statistical evaluation is made of 223 cases of poliomyelitis admitted to the Children's Hospital of the District of Columbia in 1952.

2. Management is discussed.

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THE MEDICAL MANAGEMENT OF ACUTE ANTERIOR POLIOMYELITIS

Joseph M. LoPresti, M.D.

Optimal results in the care of patients with poliomyelitis can be attained only through the cooperation of medical, orthopedic, physiotherapeutic, psychiatric, and nursing facilities. As the disease evolves and the patient progresses through the acute, convalescent, and chronic stages of his illness, one—or a combination of these facilities—is more important than the others. Thus, in the acute stage of the illness, patients are primarily medical and nursing problems. The acute stage of poliomyelitis is defined as the period of the febrile illness and includes the first 24 to 48 hours that the patient is afebrile. During this time, the disease process is active and progressive, and a final prognosis cannot be made. The medical regimen for patients in the acute stage of poliomyelitis differs depending on the location and degree of nervous system involvement which is present. This involvement assumes three principal forms:

(1) The usual type which may be non-paralytic or paralytic.

(2) The bulbar type in which the virus invades the brain or brain stem. Over half of these patients will have cranial nerve damage, the tenth cranial nerve being the one most frequently affected. Bulbar poliomyelitis is responsible for more than 90 per cent of the fatalities.

(3) The high spinal thoracic type in which the intercostal muscles and/or the diaphragm are weakened or paralyzed.

The relationship of exertion in the early stages of infection to the severity of subsequent muscle weakness or paralysis is a well-documented fact. Therefore, one therapeutic rule is common to all types of poliomyelitis in the acute stage: *Exertion is to be avoided at all costs.*

USUAL TYPE

The principles in caring for the patient with the usual type of poliomyelitis, be it paralytic or non-paralytic, are two-fold: first, to avoid exertion, and second, to prevent deformities. Absolute bed rest is the one essential feature in the acute stage of the illness. Nothing should be attempted which interferes with the patient's rest. During this period the patient is not permitted even to feed himself. He is allowed to assume any position which is restful. If placing body parts in neutral anatomic positions does not interfere with the patient's rest, then this is carried out using a Kenny bed board and footboard. The head of the bed is elevated 4 inches, so that gravity is utilized to keep the feet against the footboard. In the supine position, the knees are flexed 45 degrees with a knee roll, to alleviate the hamstring spasm. In the prone position an ankle roll and

shoulder pads are used. Neutral anatomic position of the fingers is maintained with a hand roll.

Hot packs are used judiciously and sparingly in this phase of the disease. There are numerous ways of applying moist heat to different parts of the body; all are equally effective. The only benefit to be expected from the application of moist heat is the reduction of muscle pain and spasm. Therefore, hot packs should be utilized only when pain and spasm are so severe that they interfere with rest. Since their use causes an increase in insensible water and salt loss, hot packs should not be applied more often than three or four times a day, one-half hour each session. In addition, a liberal fluid and salt intake is recommended. If the patient is restless and has severe pain, sedation with the opiates is not contraindicated. To obtain the maximal benefit from moist heat applications, each packing session should be followed immediately by physiotherapy. Physiotherapy which is entirely *passive* is one of the most effective measures for the prevention of deformities. It should be gentle and never carried to the point where it exhausts the patient or causes him pain. Nurses trained in the fundamentals of passive physiotherapy are in the ideal position to administer this phase of the patient's care. In a significant number of patients, urinary retention will pose a problem. This may be overcome efficaciously by the parenteral and oral administration of the newer parasympathomimetic drugs whose action is almost specific in causing urinary bladder stimulation, e.g., furmethide. These drugs should not be used in the bulbar or high spinal thoracic types of poliomyelitis. Finally, the diet of these patients should provide a liberal amount of calories, proteins, and vitamins.

BULBAR TYPE

Patients with bulbar poliomyelitis are almost entirely a nursing problem. If these patients can be kept alive through the acute stage, their recovery is usually complete. The principles in caring for this group are to maintain an adequate airway, and to prevent anoxemia. In general the tank respirator is contraindicated in bulbar poliomyelitis. The danger of aspiration and the inability of the bulbar patient to accommodate with the respirator are the reasons which make its use hazardous in this type of poliomyelitis. The patient is placed in Trendelenburg position and is permitted to lie on his side or in the supine position, but not in the prone position. He is constantly encouraged to keep his oropharynx clear of secretions. Because of the danger of vomiting and aspiration plus the attendant dysphagia, nothing is permitted to be taken by mouth. Gavage feedings are not given during the febrile illness. The oropharynx should be suctioned as often as is necessary to maintain a clear airway. For this purpose a soft, rubber catheter used gently will avoid traumatizing the oropharynx. To prevent

edema and occlusion of the nares, suction should not be attempted through the nose. The blood pressure and pulse rate should be checked at frequent intervals; hypertension and tachycardia are poor prognostic signs. Sedation is contraindicated in this group because it may depress vital centers. Since these patients are permitted to take nothing by mouth, they must be maintained on parenteral feedings. The total daily fluid intake should not exceed the minimum recommended level of 45 to 50 cubic milliliters per pound per day. In addition a high vitamin and high protein intake are recommended. As a prophylaxis against secondary bacterial invaders, a long-acting penicillin preparation is administered routinely. To prevent even the slightest anoxemia, oxygen is given at a rate of 6 to 8 liters per minute preferably by means of a nasal catheter. An oxygen tent is impracticable since these patients require constant supervision and care. The nurse and physician should make every effort to secure the cooperation and confidence of the patient. At all times a tracheotomy set should be kept at the bedside. The decision to perform a tracheotomy depends on the competence of personnel caring for the patient, the condition of the patient, and the type of bulbar involvement. If inadequate, untrained personnel only are available, then routine tracheotomies in all bulbar patients will produce better results. On occasion, a bulbar patient may be extremely restless or uncooperative. In such an instance, a tracheotomy may prove to be beneficial. In some cases wherein the vocal cords are paralyzed and obstruct adequate ventilation, a tracheotomy will be life-saving. Finally, the rare patient who has bulbar symptoms along with high spinal thoracic involvement, and therefore is a candidate for the tank respirator, should be tracheotomized. A careful check is kept on the respiratory rhythm of all patients with bulbar poliomyelitis. Irregularities of rhythm imply respiratory center involvement. When they occur, the use of the electrophrenic respirator is suggested.

SPINAL-THORACIC TYPE

In the group of patients with high spinal-thoracic type of disease, the tank respirator is life-saving. Since these patients have an intact respiratory center, their respirations, though labored, are regular. For this reason they are able to accommodate with the respirator. At the first sign of respiratory muscle weakness, hot packs are placed on the chest and nasal oxygen is administered for one-half hour. If the respiratory distress is not relieved, then the patient is placed in a respirator. The principles in the management of these cases are to maintain adequate ventilation, to rest the muscles of respiration, and to prevent the complications which may occur because the patient is at rest and in an enclosed space. The respirator is run at a rate of about 20 per minute, and a positive and negative pressure

of 10 milliliters is maintained. The use of both positive and negative pressure will insure more adequate ventilatory exchange, and abort the deleterious effect which negative pressure alone has on circulation. Frequent motion and massage of the patient are mandatory to prevent decubitus ulcers, venous thromboses, respiratory complications, and pulmonary emboli. A liberal fluid allowance and a low calcium diet are recommended to prevent renal lithiasis. The occurrence of atelectasis and hypostatic pneumonia may be aborted by suctioning, encouraging the patient to cough, and administering positive pressure oxygen by mask at frequent intervals during the day. A long-acting penicillin preparation is administered as a prophylaxis against secondary bacterial invaders. Again, sedatives of any kind are prohibited in this group. Obstipation and constipation are encountered frequently in the respirator patient and a regular bowel pattern should be established by the administration of a mild laxative at bedtime or enemata as necessary. It should be remembered that, even though the patient is in a respirator, positioning of parts, physiotherapy, and hot packs can be utilized. It has been our custom to initiate weaning of the patient from the respirator as soon as he has been afebrile for 24 to 48 hours. This is accomplished by a slow and gradual increase in the time during which the respirator is not in operation. At first, only the ports are opened for a brief period while the motor is kept running. Later the patient is removed from the respirator entirely for short periods, then these periods are gradually increased. At this time, the use of the rocking bed and the chest type of respirator may be considered.

SUMMARY

A practicable and feasible method of caring for patients in the acute stage of poliomyelitis has been presented. This care is predicated on the fundamental physiologic and anatomic principles. The best results will be obtained by adhering to these fundamentals. As yet, no specific therapeutic agent has proved to be of any benefit in combatting the virus, reducing the muscle spasm, or decreasing the amount of secretions. There is no substitute for moist heat. Once paralysis has occurred, no drug or agent will cause it to reverse. The acute stage is both the critical and golden period in poliomyelitis. Much good may be accomplished during this period. The patient's entire outlook may be gainfully influenced; this is particularly true in those patients who need prolonged hospitalization and care. On the other hand, irreparable harm may be caused by mismanagement, misconception, and erroneous prognostication.

THE ORTHOPEDIC CARE OF CONVALESCENT POLIOMYELITIS PATIENTS

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The care of the poliomyelitis patient requires the utmost cooperation of the pediatrician or internist, the orthopedic surgeon, and the physical medicine and rehabilitation department. During the early acute phase of poliomyelitis the care of the patient is predominantly medical. Several aspects of management at this time are, however, dictated by good orthopedic principles.

ACUTE STAGE

When the patient is acutely ill and is in considerable pain, he should be encouraged to lie flat on his back on a relatively firm bed, with his feet against a vertically placed footboard to prevent developing footdrop. It is perhaps better to avoid any vigorous hot packs and exercises, both active and passive, during this phase of the disease. After the acute stage of illness, more attention can be directed toward the orthopedic aspect of the disease.

MUSCLE EVALUATION

Although an orthopedic surgeon should examine the poliomyelitis patient relatively early in the disease in order that an evaluation of the extent of paralysis may be made, it is both inadvisable and impractical to attempt an accurate evaluation of muscle function when the child is acutely ill. The pain associated with attempting to stretch muscles, particularly the posterior groups of muscles in the lower extremities, leads only to a false evaluation of muscle function.

At the time of early muscle evaluation, it is difficult to predict the ultimate degree of recovery of the patient. There is a great variability in the disease from one person to another during the same year, and also from one year to another. It has been estimated that, even in severe epidemics, 50 percent of the cases are non-paralytic. Even many of the paralytic cases will recover. The degree of the paralysis at the onset of the disease and the nature of its regional distribution are suggestive, but not conclusive, of the end result. After three months a non-functioning muscle that has shown little tendency toward recovery will probably not improve. The weaker the muscle after early examination, the poorer the recovery is likely to be.

ORTHOPEDIC CARE

The active orthopedic care of the patient may be considered to begin in the convalescent phase of the disease, which is generally that period after

the febrile illness has ended. Although it is difficult to state precisely the beginning of the convalescent period, it may be considered to extend for about a year after the onset of the disease. Green[1] divides the convalescent stage into (1) the sensitive phase, accompanied by pain and spasm; and (2) the asensitive phase, when both muscle spasm and pain have disappeared.

The goal of early orthopedic care is to prevent the development of contractures and their resultant deformities. It is much easier to prevent deformities than it is to correct them. Hot packs and early passive motion within the limits of pain are extremely beneficial.

Much has been written about the significance of spasm. According to the early teaching of Sister Kenny, spasm was considered the most damaging factor in poliomyelitis. While the importance of the presence of spasm in these cases cannot be underestimated, it is felt by most orthopedic surgeons that the paralysis of the involved muscles is the primary damaging factor in poliomyelitis, and not the spasm. Muscles that are sensitive and "in spasm", however, do contribute to deformity in this sense: If the opposing muscle is paralyzed and lacks the ability to cope with the deforming factors of spasm a deformity is likely to result. However, the proponents of the Kenny technique have stimulated a re-evaluation of the various physical techniques used, and emphasized the harmful effects of unnecessarily long immobilization.

NURSING CARE

Good nursing care is most important in the convalescent stage of the disease. The bed should be firm. A board should be used under the mattress. The use of a footboard is now a standard procedure in the poliomyelitis ward. The mattress may be pulled up toward the head of the bed, so that the patient when lying on his abdomen will have space for his feet against the footboard. Hot packs may be used in both the supine and prone positions, and should be discontinued when the sensitive stage is over. During the convalescent period excessive fatigue should be avoided.

PHYSICAL THERAPY

It is also most important that in the convalescent stage the treatment be supervised by one trained in the treatment of musculo-skeletal diseases; and the physical therapist should be specially trained in the treatment of poliomyelitis. The physical therapist may visit the patients on the ward and begin early treatment consisting of exercising the joints within the limits of pain.

Exercising of the joints must be gentle and should not be forced during the early painful stage of the disease. As the pain and spasm subside the

exercises may be increased. Muscle training exercises should be begun in the early non-sensitive convalescent stage. A proper muscle evaluation may also be done at this time. The use of the Hubbard tank and underwater exercises is highly advisable and desirable. A careful observation must be made to determine whether there is any developing curvature of the spine, or contracture of joints.

APPLIANCES AND AMBULATION

Braces and other appliances are used when indicated. Crutches may be desirable. Braces may be necessary to prevent deformities from developing. The extent to which the patient may be mobilized depends upon the degree and extent of paralysis. If only an upper extremity is involved the patient may be allowed out of bed after the sensitive phase has passed. However, if the trunk muscles are involved the patient will have to spend a longer period of recumbency. A good fitting back support is necessary prior to ambulation. It may be said that practically all patients can be made ambulatory in one way or another.

SUMMARY

The necessity of a well organized and functioning program in the care of the poliomyelitis patient is obvious. The close cooperation of the various specialities will facilitate the care and management of the poliomyelitis patient.

From the orthopedic viewpoint, the prevention of contractures and deformities is most important.

Until that long-awaited time when a more specific preventive or therapeutic remedy is available, we must continue our endeavors to salvage such function as remains in the poliomyelitis patient.

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EMOTIONAL DIFFICULTIES ENCOUNTERED IN CHILDREN WITH POLIOMYELITIS

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In the past five years approximately 850 children with poliomyelitis have been admitted to the Children's Hospital. About fifty of them were referred to the Department of Psychiatry for some type of emotional difficulty associated with their illness. Psychiatric consultations, diagnostic

studies, and treatment of these children provide the basis for the following impressions.

Most of the cases were referred after the acute phase of the illness. The emotional problems of the children could be classified roughly into four somewhat overlapping categories:

1. Difficulties which interfered with treatment.
2. Difficulties with ward adjustment.
3. Personality changes following the acute illness.
4. Stormy emotional adjustment to handicapping residuals.

It was not uncommon for the first two groups to be found together in the same child.

Most of the children seen by the Department of Psychiatry could be considered as having emotional difficulties which interfered with their treatment. This type of disturbance usually centered around lack of co-operation with physiotherapy or in following such therapeutic routines as staying in one position and keeping removable casts or braces in place. A few instances were encountered of children refusing to leave the security of the tank or the electrophrenic respirator.

The ward adjustment difficulties covered a wide range. One extreme included the overactive, destructive, distractible, aggressive child with or without temper tantrums, assaultiveness, abusiveness and "incitement to riot". Tending toward the opposite extreme was the non-eater and non-sleeper, the bed wetter, soiler, and rocker; the withdrawn, tearful, fearful or depressed child. In general, the hard to handle, "acting out" child was more likely to be referred for help with a tendency, as is generally true, on the part of the doctors, nurses, and special therapists to disregard or overlook for long periods problems in the more passive child who was not openly disturbing.

Among those few children displaying personality changes, there were three with sufficient evidence of organic brain involvement to indicate that they had post-encephalitic syndromes. It was surprising that in these three, there was no apparent correlation between the severity of the transient acute encephalitic manifestations in the earlier stage of the disease and the post-encephalitic residuals. The children so involved did not have characteristically post-encephalitic behavior disorders, although one did show increased impulsivity and short attention span. Their changes in behavior included loss of interest in those activities which they had previously enjoyed, ready tearfulness, seclusiveness, drop in level of intellectual ability and intolerance for excitement. The organic indicators were more in the nature of "soft" signs, such as changes in postural reflexes and aphasic phenomena, not always accompanied by aberrant deep tendon reflexes or positive Babinski sign.

The children showing adjustment difficulties that seemed to be related to their handicapping residuals were in two general categories: (a) those whose loss of function was used to influence others in such maneuvers as maintaining a position in the family, influencing others (including other children) in competitive situations, and as a means of escape from unpleasant or anxiety producing situations; (b) those whose handicaps genuinely hampered learning, such as those with minor aphasic phenomena which interfered with acquiring such skills as speech or reading.

It was apparent that the majority of children with "problem" behavior brought their problems with them to the illness. Where the initial history inquired into the child's behavior status, relationships and habits, the ward personnel were able often to deal with behavior problems before they could become entrenched with the child in his new environment. The Social Service Department was quite valuable in working out a picture of the child's patterns and also in working with the parents after the child left the hospital. It was possible in a majority of cases to work out the problem on the ward. Simple observation and conversations with the child and his family often disclosed what the child's symptoms indicated in terms of the child's needs. Based upon these needs, modifications of handling and special approaches were then employed successfully in treatment. A few children needed more definitive approaches and were brought into the playroom for diagnostic and therapeutic sessions. Dramatic changes often took place after even one or two such sessions, indicating that in these instances the problems were not deep-seated.

In a few cases it became evident that the child's problem behavior had developed since the onset of illness, hospitalization, or even after a fairly long period of therapy. Some of the problems were reflections of interference by the illness with a phase of personality development. Consequent manifestations were tendencies to increased dependency, fears of separation, return to more infantile behavior, and unreasonable fears of bodily hurt. Fear of punishment, misinterpretation of the illness as a punishment and the threat of permanent crippling because he was uncooperative were among the factors which disturbed the younger child. Sometimes these thoughts were imparted directly to a child by student nurses, aides, or other children. Sometimes they were reflections of what the child understood from bedside or physiotherapy rounds. Some of the ideas about the effects of poliomyelitis were garnered from newspapers, radio and television reports.

Emotional responses to the actual physical handicap were conditioned in some children by the age and stage of motor development achieved by the youngsters when the illness struck. In other words, there was a marked difference in motivation to walk depending upon whether a child already

had a concept of walking before becoming ill. The type of motor activity patterns before illness seemed also to make some difference in the child's adjustment to motor loss or weakness. For example, confinement had greater significance to a child who earlier had a pattern of hyperactivity than to a less active individual. Sometimes the formerly hyperactive child needed added help in the form of outlets of a rhythmic nature and opportunities to obtain movement satisfaction on Bradford frames if nothing else was available.

The use of the handicap for secondary gain was not so common as might be expected. However, certain situations were encountered which colored the wish to overcome handicaps. These included the advantages of closer parental care than that afforded to healthier, previously preferred siblings and the situation wherein a not-too-popular girl now had a basis in her publicized illness for having the boys carry her books.

On the whole, the child with poliomyelitis appears to have less frequent emotional disturbances in response to his illness, handicaps and therapy than does the child with other chronic illnesses requiring long periods of hospitalization. Possibly, this is due partly to the concentration of attention given the poliomyelitis group, not only in publicity, but also in terms of the comparatively larger numbers of personnel working with them, the fuller activity, and active therapeutic day. It is also true that these children do not feel ill after the acute phase of disease and are able to drain off some of their own anxieties about their handicaps by being with a group with similar difficulties, a situation not usually present to the same extent on the usual ward.

The above discussion of factors underlying emotional difficulty in children with poliomyelitis would seem to indicate that the total care of these children should include a knowledge and consideration of previous and present emotional patterns of each child, and his present stage of personality development. Both professional and non-professional hospital personnel should avoid imparting to the child by careless words or attitudes feelings that falsely link his illness with punishment or with death and permanent crippling. The grouping of children with similar handicaps and activities is also felt to be quite helpful in minimizing the individual's worries and resistances.

THE OCCURRENCE OF COXSACKIE VIRUSES IN HOSPITALIZED POLIOMYELITIS PATIENTS

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A cursory examination of the medical literature which so often refers to Coxsackie viruses and poliomyelitis in the same breath may well be confusing and misleading. For example, despite a rather clear etiological association of herpangina (vesicular pharyngitis) with certain group A Coxsackie viruses[1] and of epidemic pleurodynia to certain group B Coxsackie viruses[2], many reports concern the isolation of both group A and B viruses from poliomyelitis patients[3]. In fact, several publications have recorded what appears to be a significantly high incidence of Coxsackie virus isolation from patients with poliomyelitis[4].

Information gathered over a period of three years on hospitalized poliomyelitis patients at The Children's Hospital, Washington, D. C., has not confirmed these latter reports. Data accumulated may, on the contrary, provide one explanation for the reported incidence of Coxsackie virus isolation from poliomyelitis patients. This information is the result of joint efforts on the part of workers from the National Microbiological Institute, National Institutes of Health and the Research Foundation, Children's Hospital. Data presented in this summary for the special issue of *Clinical Proceedings* will be included in a more comprehensive review of the subject[5].

METHOD AND MATERIAL

From patients with the clinical diagnosis of poliomyelitis during the summers of 1950, 1951 and 1952, whole stool specimens were obtained soon after admission to the hospital and at approximately weekly intervals during hospitalization. The specimens were frozen and stored in sterile glass containers at −20 to 30 degrees centigrade until the time of testing. Isolation and identification of viral agents was accomplished in suckling mice by methods previously outlined[6, 7].

RESULTS

In the three years, 788 stool specimens from 429 children with a clinical diagnosis of poliomyelitis were examined. The feces of 12 patients demon-

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strated group A Coxsackie viruses of five different strains. Six of the isolations were from specimens obtained during the first five days of hospitalization. Nine isolations resulted from specimens obtained after five days of hospitalization and in seven of these nine, one or more previous specimens had proven negative.

TABLE I

Incidence of Coxsackie virus isolations in poliomyelitis patients at Children's Hospital during 1950, 1951, 1952

	1950	1951	1952	TOTAL
Persons Tested	131	76	222	429
Specimens Tested	131	246	411	788
No. Persons Positive				
Group A Coxsackie	0	2	10	12
Group B Coxsackie	0	1	2	3
All Coxsackie	0	3	12	15

No strain predominated among the patients except a single group A virus which was recovered from six patients who were present in the same ward at the same time. Data regarding the time of isolation of virus and development of serological titres against the strain in these six children indicate a strong probability that most of them acquired the Coxsackie virus after hospitalization[8].

Poliomyelitis was a reasonable clinical diagnosis in the children from whose specimens Coxsackie virus was isolated. All of them demonstrated signs of meningeal irritation and muscle spasm or cerebro-spinal fluid changes or both. Some degree of muscle weakness was noted in three but severe paralysis was seen in none. One case had mild signs of bulbo-spinal involvement. None of them showed manifestations of herpangina or pleurodynia.

DISCUSSION

Current epidemiologic information indicates that certain strains of group A Coxsackie virus cause herpangina[1] and that certain strains of group B Coxsackie virus cause epidemic pleurodynia[2]. However, the herpangina and pleurodynia strains as well as other group A and B Coxsackie viruses have been found in the feces of poliomyelitis patients[3]. (It has been in the poliomyelitis patients, incidentally, that the search for these viruses has been concentrated.)

To assume that there is any direct relationship between these Coxsackie virus strains and clinical poliomyelitis is scarcely warranted from the evidence available. Several alternate explanations for the finding of Coxsackie virus in poliomyelitis patients are quite plausible.

Within the Children's Hospital study, for example, there is evidence that, despite isolation precautions, some patients probably contracted these viruses while they were hospitalized, an occurrence which might well be predicted from the ubiquity of these infectious agents and their known contagiousness within a family group or neighborhood. Thus seven of the patients with virus first evidenced positive specimens at a time when they had been in the hospital for five days or more and when from one to three negative stools had previously been obtained. (The incubation period for infections with group A Coxsackie viruses is four to six days.[7])

Eight children with poliomyelitis in this study, however, did have Coxsackie virus in their first specimen after ward admission, six of these specimens having been obtained during the first five days in the hospital. This 1.8 per cent incidence of Coxsackie virus isolation from poliomyelitis patients during early hospitalization should be considered in the light of what the expected rate of recovery would be in a similar group of children who did not have poliomyelitis. Cole, et al, have shown that 3.5 per cent of persons who are not ill or who have miscellaneous unrelated illnesses may harbor Coxsackie viruses during the summertime[7]. Unpublished data on Children's Hospital dispensary or ward admission patients with illnesses other than herpangina or poliomyelitis during the summer of 1952 showed that Coxsackie virus was recovered from 8.8 per cent of these children[9]. It would appear reasonable then to expect the occasional isolation of Coxsackie viruses from poliomyelitis patients on the basis of their chance occurrence in a specimen collected during the summer.

Such isolation of Coxsackie viruses in well persons or in persons with miscellaneous illnesses may result from subclinical or undiagnosed infection with these viruses. Both convalescent and well carrier states are also likely since asymptomatic persons have been shown to maintain virus in the stools for 76 days and convalescent herpangina patients for 47 days[7].

The experience of three years work with poliomyelitis patients at Children's Hospital does not support the hypothesis that Coxsackie viruses cause a disease resembling poliomyelitis. There is insufficient evidence in this study to reach any conclusion regarding what influence, if any, the presence of Coxsackie virus may have on the clinical picture of persons with poliomyelitis.

SUMMARY

In a study of hospitalized poliomyelitis patients:

(1) Only 3.5 per cent of 429 children showed Coxsackie group viruses in their feces.

(2) 46 per cent of these patients with Coxsackie viruses first had positive

specimens after they had been in the hospital for over five days and after previous specimens had been negative.

These data do not confirm the hypothesis that Coxsackie viruses cause an illness resembling poliomyelitis. Isolation of Coxsackie viruses from some of the poliomyelitis patients in this study can be explained on the basis of hospital spread of virus and in certain other instances on the basis of virus carrier states or expected community incidence.

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CHILDREN'S HOSPITAL ALUMNI REUNION

Two features of the third Annual Reunion of the Children's Hospital Alumni Association were the presentation of a gift to Mr. James H. Lemon, past president of the Board of Directors of the Children's Hospital, in appreciation of his significant leadership during the construction of the new building, and the awarding of prizes for the best scientific papers written by members of the resident staff, the second time such prizes have been offered. A cocktail party given by the Mead Johnson Company preceded the Alumni dinner and election of officers. Mr. Samuel Spencer, Commissioner of the District of Columbia, was the speaker of the evening, and Dr. Preston A. McLendon, president of the Alumni Association, was chairman of the meeting and toastmaster.

Dr. Edgar P. Copeland, Chief of the Medical Staff and a member of the Board of Directors, introduced Mr. Lemon, highlighting some of his numerous achievements. Dr. Copeland then presented a barometer to Mr. Lemon on behalf of the Alumni Association and the Staff.

Awards for the best scientific papers were presented as follows:

First prize, $100 in cash, to Dr. David A. St. Martin, for his paper, "Correction of Acidosis with Sodium Succinate."

First Honorable Mention, $50 in cash, to Drs. Eulaine Naiden, Jesse W. Nudelman and Stanley I. Wolf, for their paper, "Clinical and Laboratory Differential Diagnosis between Herpangina and Infectious Gingivostomatitis."

Second Honorable Mention, $50 in cash, to Dr. Eulaine Naiden for her paper, "The Total Circulating Eosinophile Count in Pediatric Patients under Environmental and Stress Stimuli."

The prize-winning papers were judged by the Publications Committee and the cash awards were donated by the Medical Staff. Presentation of the awards was made by Dr. E. Clarence Rice, Chairman of the Publications Committee.

Dr. J. Ellery Michaud of Fall River, Mass., received the Annual Award made to the Alumnus who traveled farthest to attend the meeting.

Dr. McLendon, who presided, and introduced the speaker, also related some interesting and amusing experiences during his residency at the Children's Hospital.

Following the speeches, officers for the coming year were elected as follows:

President, Dr. Edward B. Brooks
Vice-President, Dr. Carolyn S. Pincock
Secretary-Treasurer, Dr. Archibald R. MacPherson

After election of officers and presentation of awards, the meeting adjourned. The reunion was attended by 150 alumni, staff members and guests.

MISS RODDY LEAVES

Miss Jeanne deChantal Roddy, for five years general manager of *Clinical Proceedings*, has resigned to accept another position. At a meeting of the Editorial Board of *Clinical Proceedings* held May 12 in Dr. Blair's office, members of the board gave a silver tray to Miss Roddy in appreciation of her services. Dr. E. Clarence Rice, editor-in-chief of *Clinical Proceedings*, made the presentation and thanked Miss Roddy for her outstanding work. Mrs. Rhoda Frances Dobbin, newly appointed general manager for *Clinical Proceedings*, was then introduced to the board members.